REMARKS

This response is intended as a full and complete response to the non-final Office Action mailed December 28, 2005. In the Office Action, the Examiner notes that claims 1-14 are pending and rejected.

In view of the following discussion, Applicants submit that none of the claims now pending in the application are obvious under the provisions of 35 U.S.C. §103. Thus, Applicants believe that all of the pending claims are now in allowable form.

It is to be understood that Applicants do not acquiesce to the Examiner's characterizations of the art of record or to Applicants' subject matter recited in the pending claims. Further, Applicants are not acquiescing to the Examiner's statements as to the applicability of the art of record to the pending claims by filing the instant response.

REJECTIONS

35 U.S.C. §103

Claims 1, 3-7, 9-11, 13 and 14

The Examiner has rejected claims 1, 3, 7, 9, 10, 11, 13 and 24 as being obvious and unpatentable under 35 U.S.C. §103(a) over U.S. Patent 6,597,841 to Dingel et al. (hereinafter "Dingel"). Applicants respectfully traverse the rejection.

In general, Dingel teaches an optical device for receiving an optical signal of one or more wavelengths. The optical device includes an n-way optical coupler to split the optical signal by an intensity ratio into n branch signals. In particular, Dingel teaches an arrayed waveguide grating which includes a first optical slab having n input ports, where each branch signal is coupled to a different input port, and a waveguide array structure including a plurality of waveguides having incrementally different path lengths. (Dingel, Abstract).

Dingel, however, fails to teach or suggest Applicants' invention of at least claim 1, as a whole. In particular, Dingel fails to teach or suggest at least the limitation of "wherein the passive portion and the active portion are integrated in accordance with active/passive monolithic integration techniques, wherein the active portion comprises at

least one active device for modifying at least one of said first polarization component and said second polarization component." Specifically, Applicants' claim 1 positively recites:

> 1. An integrated polarization splitter having a passive portion and an active portion, comprising:
> an arrayed waveguide grating (AWG) in the passive portion, the AWG including:
> an input coupler;
> an output coupler; and
> a plurality of waveguides of unequal length connecting said input and output couplers;
> wherein at least two output ports of said AWG are positioned relative to an input port such that a first polarization component and a second polarization component of a single channel input signal arriving at different phase fronts of a free space region at an output side of said AWG are respectively received by separate ones of said output ports such that said first polarization component and said second polarization component are split by said AWG; and
> wherein the passive portion and the active portion are integrated in accordance with active/passive monolithic integration techniques, wherein the active portion comprises at least one active device for modifying at least one of said first polarization component and said second polarization component.
> [Emphasis added.]

As taught in Applicants' invention of at least claim 1, the arrayed waveguide grating (AWG) in the passive portion of the integrated polarization splitter splits a single channel input signal to form a first polarization component and a second polarization component. Applicants' invention of at least claim 1 further teaches that the passive portion of the integrated polarization splitter is integrated with an active portion of the integrated polarization splitter in accordance with active/passive monolithic integration techniques. As such, since the active portion is integrated with the passive portion, at least one of the first polarization component in the second polarization component may be modified by at least one active device of the active portion. In other words, the split polarization components may be actively modified individually.

By contrast, Dingel teaches a controller coupled to an n-way optical coupler. As taught in Dingel, the controller merely controls the n-way optical coupler for controlling the splitting of an input signal. The controller taught in Dingel simply does not modify the branch signals resulting from the splitting of the input signal by the n-way optical coupler. Specifically, Dingel teaches that "[t]he n-way optical coupler may be controllable to alter the ratio of the intensities of the branch signals. Such control may be achieved using, for

example, a thermo-optic or an electro-optic effect...For example, in a first state, the controller can set the intensity ratio (between the branch signals) to be a first intensity ratio, or it can set the number of resultant branch signals to be a first number (cease e.g., 2, 3, etc.). In a second state, the controller can set the intensity ratio to be a different intensity ratio or set the number of resultant branch signals to be a different number." (Dingel, Col. 4, Line 63 – Col. 5, Line 15).

In other words, as taught in Dingel, the controller merely controls the passive splitting of the input signal with respect to intensity ratio or number of resultant branch signals. As such, although Dingel teaches that the splitting of the input signal may be controlled by a controller using an electro-optic effect, the electro-optic effect merely actuates the n-way coupler for controlling how the input signal is split (i.e., with respect to intensity ratio or number of resultant branch signals). Furthermore, as taught in Dingel, the controller is only coupled to the n-way coupler. In other words, the controller does not even have a means of accessing the resultant branch signals, much less operating as an active component for modifying the resultant branch signals. As such, the controller in Dingel simply cannot operate on the resultant branch signals after the input signal is split.

Furthermore, Dingel is completely devoid of any teaching or suggestion of an active device for modifying resultant branch signals. Dingel is completely devoid of any teaching or suggestion of any active device whatsoever. Dingel is completely devoid of any teaching or suggestion of any active portion whatsoever. Moreover, Dingel is completely devoid of any teaching or suggestion of active/passive monolithic integration techniques. In fact, not only is Dingel devoid of any teaching or suggestion of any active portion, active device, or active/passive monolithic integration techniques, none of these words even appear anywhere in the Dingel reference. Dingel merely teaches a passive AWG without any active portion, active devices, or active/passive monolithic integration techniques whatsoever.

In the Office Action, the Examiner states that "although Dingel et al does not state the active and passive portions to be integrated with the polarization beam splitter, the definition of integrated is "to make into a hole by bringing all parts together; unify."" (Office Action, Page 5). Applicants respectfully point out that Applicants' claim 1 does

not merely state that the active and passive portions are integrated. Rather, Applicants' claim 1 states "wherein the passive portion and the active portion are integrated in accordance with active/passive monolithic integration techniques." As such, the Examiner's use of a dictionary definition of "integrate" simply does not teach integration in accordance with active/passive monolithic integration techniques, as taught in Applicants' invention of at least claim 1.

As such, Dingel is completely devoid of any teaching or suggestion of an active portion or integration of an active portion and a passive portion, much less integration of an active portion and a passive portion in accordance with active/passive monolithic integration techniques. In fact, Dingel is completely devoid of any active devices or device integration techniques whatsoever. Rather, Dingel merely teaches a passive, multi-output arrayed waveguide grating device having n-way optical couplers and an arrayed waveguide grating for demultiplexing optical signals. In other words, Dingel merely teaches passive splitting of optical signals into a plurality of associated optical signal components. Nowhere in Dingel is there any teaching or suggestion of any active devices, much less integration of an active device with the passive AWG. Therefore, the Dingel reference fails to teach or suggest Applicants' invention, as a whole.

The test under 35 U.S.C. §103 is not whether an improvement or a use set forth in a patent would have been obvious or non-obvious; rather the test is whether the claimed invention, considered as a whole, would have been obvious. Jones v. Hardy, 110 USPQ 1021, 1024 (Fed. Cir. 1984) (emphasis added). Moreover, the invention as a whole is not restricted to the specific subject matter claimed, but also embraces its properties and the problem it solves. In re Wright, 6 USPQ 2d 1959, 1961 (Fed. Cir. 1988) (emphasis added). The Dingel reference fails to teach or suggest Applicants' invention as a whole.

Therefore, Applicants submits that independent claim 1 is not obvious and fully satisfies the requirements of 35 U.S.C. §103 and is patentable thereunder. Furthermore, independent claims 10 and 14 include limitations substantially similar to the limitations of claim 1. Therefore, for at least the same reasons discussed above with respect to independent claim 1, Applicants submits that independent claims 10 and 14 are also not

obvious and fully satisfy the requirements of 35 U.S.C. §103 and are patentable thereunder.

As such, Applicants submit that independent claims 1, 10 and 14 are patentable over Dingel under 35 U.S.C. §103(a). Furthermore, claims 3-7, 9, 11, and 13 depend directly or indirectly from independent claims 1 and 10 and include additional limitations therefor. Therefore, for at least the same reasons as discussed above with respect to independent claims 1, 10 and 14, Applicants submits that dependent claims 3-7, 9, 11 and 13 are also not obvious and fully satisfy the requirements of 35 U.S.C. §103 and are patentable thereunder. Therefore, Applicants respectfully request that the rejection be withdrawn.

Claims 2 and 12

The Examiner has rejected claims 2 and 12 under 35 U.S.C. §103(a) as being obvious and unpatentable over Dingel as applied to claims 1 and 10 above and further in view of U.S. Patent 6,853,769 to McGreer (hereinafter "McGreer"). The Applicants respectfully traverse the rejection.

For at least the reasons discussed above, independent claims 1 and 10 are non-obvious in view of Dingel and are patentable under 35 U.S.C. §103(a). Furthermore, McGreer fails to bridge the substantial gap between Dingel and Applicants' invention. In general, McGreer discloses an arrayed waveguide grating with waveguides of unequal widths. In particular, McGreer discloses that each waveguide of the grating has a substantially uniform width, but the width of any single waveguide in the grating is selected based on a predetermined birefringence required for the waveguide.

McGreer, however, is completely devoid of any teaching or suggestion of an active portion or active device. As such, McGreer must be devoid of any teaching or suggestion of the integration of an active portion and a passive portion, much less integration of an active portion and a passive portion in accordance with active/passive monolithic integration techniques. Furthermore, McGreer must also be completely devoid of any teaching or suggestion that an active portion includes at least one active device for actively modifying polarization components produced by the passive portion of the polarization splitter.

Thus, the Dingel and McGreer references, either singly or in combination, fail to teach or suggest Applicants' invention as a whole. Therefore, independent claims 1 and 10 are non-obvious over Dingel in view of McGreer and are patentable under 35 U.S.C. §103. Furthermore, claims 2 and 12 depend directly from independent claims 1 and 10 and recite additional limitations therefor. Thus, for at least the reasons discussed above, claims 2 and 12 also are non-obvious over Dingel in view of McGreer and are patentable under 35 U.S.C. §103. Therefore, Applicants respectfully request that the rejection be withdrawn.

Claim 8

The Examiner has rejected claim 8 under 35 U.S.C. §103(a) as being obvious and unpatentable over Dingel as applied to claim 1 above and further in view of U.S. Patent 5,838,870 to Soref. Applicants respectfully traverse the rejection.

For at least the reasons discussed above, independent claim 1 is non-obvious in view of Dingel and is patentable under 35 U.S.C. §103(a). In particular, Dingel fails to teach or suggest at least the limitation of "wherein the passive portion and the active portion are integrated in accordance with active/passive monolithic integration techniques, wherein the active portion comprises at least one active device for modifying at least one of said first polarization component and said second polarization component," as taught in Applicants' invention of at least claim 1. Furthermore, Soref fails to bridge the substantial gap between Dingel and Applicants' invention.

In general, Soref discloses nanometer-scale silicon-on-insulator (SOI) photonic components. Soref discloses nanometer-scale silicon-on-insulator guided-wave optical components in the near infra-red, including a quantum well portion using intersubband or band-to-band photonic effects. In particular, Soref discloses integration of waveguides and quantum wells. Although Soref teaches the integration of many thousands of such components on a silicon chip, Soref is completely devoid of any teaching or suggestion that the active portion includes at least one active device for actively modifying at least one of a plurality of polarization components produced by the passive portion. Rather, Soref specifically teaches that the waveguides simply guide the received optical signals to the multiple quantum well (MQW) portions which operate as active devices. As such,

the active devices of Soref do not modify separate polarization components of an optical signal. Rather, the active devices of Soref modify un-separated optical signals. Thus, Soref fails to teach or suggest Applicants' invention of claim 1, as a whole.

Furthermore, Dingel and Soref cannot even be operably combined. As described herein, Dingel discloses an optical device for demultiplexing optical signals using an AWG. The AWG uses input and output couplers for coupling the waveguide array to input and output fibers respectively. As described herein, Soref teaches active strip-waveguide devices. Soref teaches coupling a light beam from an optical fiber into a strip-waveguide, or coupling a light beam from a strip-waveguide into an optical fiber. Since Dingel teaches a passive arrayed waveguide grating for coupling optical signals and optical fibers and Soref teaches active individual waveguides for coupling optical signals and optical fibers, the means for coupling optical signals into and out of optical fibers is completely different for Dingel and Soref, and since multiple such coupling means may not be employed simultaneously, Dingel and Soref simply cannot be operably combined.

As such, the Dingel and Soref references, either singly or in combination, fail to teach or suggest Applicants' invention as a whole. Therefore, independent claim 1 is non-obvious over Dingel in view of Soref and is patentable under 35 U.S.C. §103. Furthermore, claim 8 depends directly from independent claim 1 and recites additional limitations therefor. Thus, for at least the reasons discussed above, 8 also is non-obvious over Dingel in view of Soref and is patentable under 35 U.S.C. §103. Therefore, Applicants respectfully request that the rejection be withdrawn.

CONCLUSION

Thus, Applicants submit that none of the claims presently in the application are obvious under the of 35 U.S.C. §103. Accordingly, both reconsideration of this application and its swift passage to issue are earnestly solicited.

If, however, the Examiner believes that there are any unresolved issues requiring adverse final action in any of the claims now pending in the application, it is requested that the Examiner telephone Michael Bentley at (732) 383-1434 or Eamon J. Wall at (732) 530-9404 so that appropriate arrangements can be made for resolving such issues as expeditiously as possible.

Respectfully submitted,

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